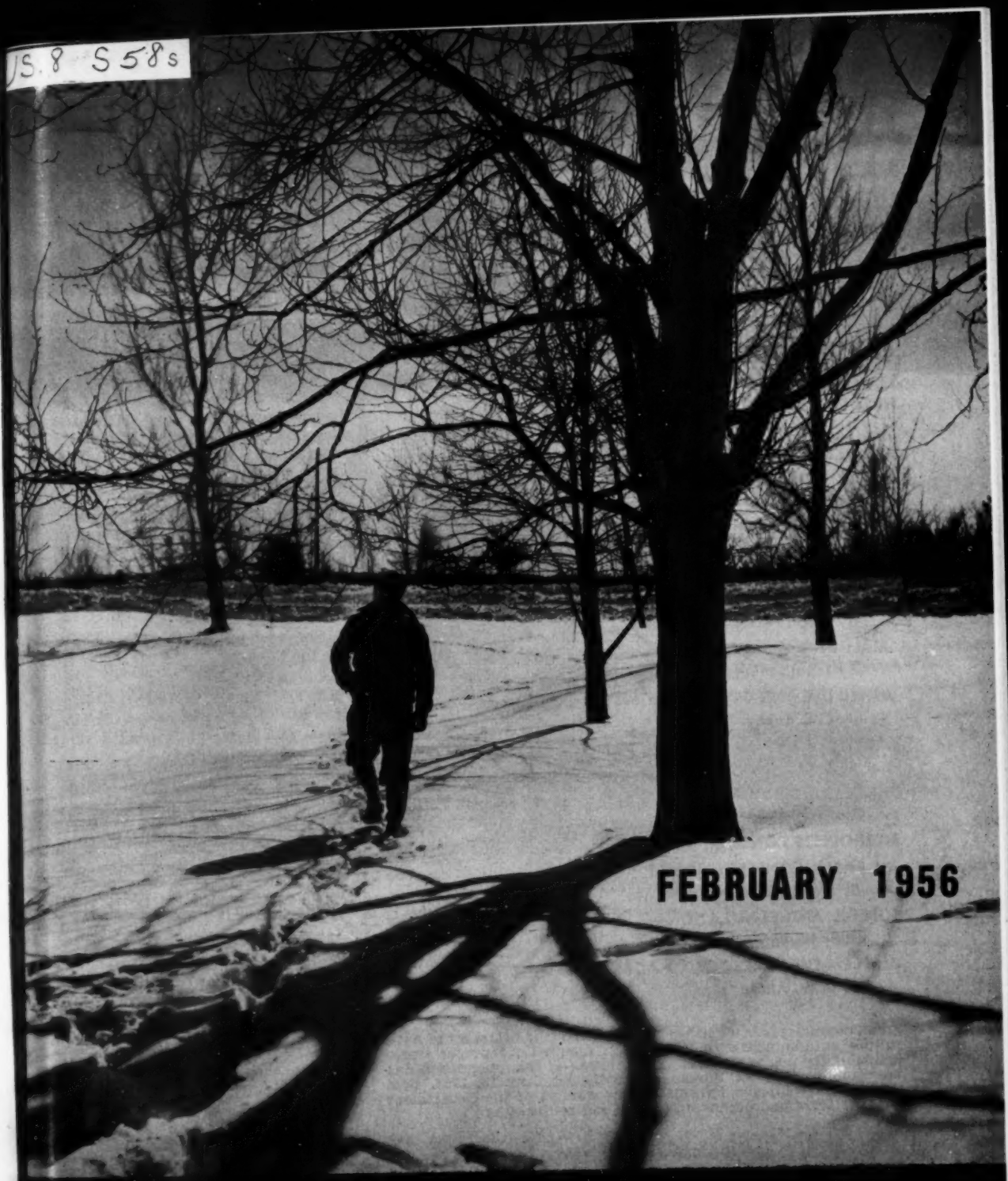

FEBRUARY 1956

SOIL CONSERVATION

Soil Conservation Service • U. S. Department of Agriculture

SOIL CONSERVATION•

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VOL. XXI—NO. 7

EZRA TAFT BENSON
SECRETARY OF AGRICULTURE

DONALD A. WILLIAMS
ADMINISTRATOR, SOIL CONSERVATION SERVICE

OFFICIAL ORGAN OF THE SOIL CONSERVATION SERVICE
U. S. DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

★ THIS MONTH ★

SOIL CONSERVATION is published by direction of the Secretary of Agriculture as administrative information required for proper transaction of the public business. The printing of this publication has been approved by the Bureau of the Budget, July 18, 1955. SOIL CONSERVATION supplies information for workers of the Department of Agriculture and others engaged in soil conservation.

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PERSIAN PROVERB.—An item in the Foreign Agricultural Service News Bulletin at Tehran, Iran, tells of the soil conservation work being done by Manucher Ahmadi, an attorney and farm owner. Ahmadi started the farm 17 years ago from nothing. Today the land produces an average of 5 tons of various farm products daily. Ahmadi is especially proud of his peach, apple, and pear trees that he set out himself one by one and has since given his personal care.

Pointing to his fruit trees recently, Ahmadi said: This is the best monument that one can build for himself." Then he quoted from a Persian poem: "Others planted and we ate the fruit of their labor; now we should plant for others to eat."

BETTER THAN HAULING.—"But for my farm pond, it would have taken one man with a pickup 4 months to haul water for my cattle."

That was one way in which a farm pond served Joe Miller of Jefferson, S. C., during a dry spell. Miller is a cooperator with the Chesterfield Soil Conservation District.

Editors are invited to reprint material originating in this magazine.

FRONT COVER.—Long shadows on the snow lend winter enchantment to this Maine farmstead.

All orders go to the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

He Will Always Remember

Incident at New Hampshire Church

By ALLAN J. COLLINS

IF someone, someday, asks me to recount the most satisfactory experience of my life as a conservationist, almost certainly I shall hark back to the graduation exercises at Union (population 400), N. H. There, Helen Abbott and Florence Gerrish teach 8 grades in a little, 2-room schoolhouse and this is really their story. I was but an eyewitness to what I shall always consider a beacon light on conservation's own road to Damascus.

The tiny, white church that serves as a public auditorium was overflowing when I arrived. I am sure half the town was there. Seating myself with a work unit conservationist and a soil surveyor I began to get a glimmering as to why SCS had been invited. The hall was alive with conservation displays—soil profiles, posters, tree samples, photos, animal track models, and drawings—all done with the flamboyant abandon of young hands and minds. And conservation sprang alive in the program.

A hush settled over the audience, including the well-scrubbed and glowing youngsters, with the first soft notes from the organ. Then a choral group of women—school mothers I learned later—arose and sang the first of a number of remarkable songs interspersed throughout the ceremony—songs of the soil, of the forest, the waters, and wildlife. Tunes from some ancient hymnal, lyrics of their own devising.

The minister spoke and the strong, heady poetry of the Bible rolled across the rafters, speaking Man's love of the land, his devotion

Note.—The author is state conservationist, Soil Conservation Service, Durham, N. H.

Cast assembled for conservation pageant.

Conservation story is told in song.

and infidelities to it through the ages. The school superintendent followed suit, in his own manner and outlook.

Now all eyes turned to the children in their moment of glory in the proceedings. Each in turn took the floor and I could hardly believe my ears. We heard about soil, water, animal life, and forests. A 12-year old delivered as fine a history of the U. S. Soil Conservation Service as I've ever heard. We heard too about the Fish and Wildlife Service, the Forest Service, and State agencies and what they were doing for conservation.

Helen Abbott.

Another 12-year old spoke on the life of Dr. Hugh Hammond Bennett, father of soil conservation. Another discussed the life of Gifford Pinchot, pioneer of modern forestry. A little fellow went to the model animal tracks, identified them, told us all about the species and how they fitted into the local wildlife conservation scheme.

As I listened to the clear, childish voices, ringing with sincerity, how I wished that all my associate conservationists scattered across our broad land could have been there to feel the thrill of new inspiration for the task that still stretches over the horizon. I am certain that they, like the SCS-men present, would have glimpsed once again the ideal that drew us into this strange and wonderful calling.

A few more of the remarkable songs, then the diplomas, and the graduation exercises ended. But the memory will live on forever, as far as I'm concerned.

(Continued on page 155)

Japan Works to Control Erosion

By SHOZO TSUJI

JAPAN has erosion problems, too. And it is very serious to this country because of its excess population and small cropland area.

This report is written about erosion problems of Nanyo District in Ehime prefecture, one of the erosion problem areas in Japan.

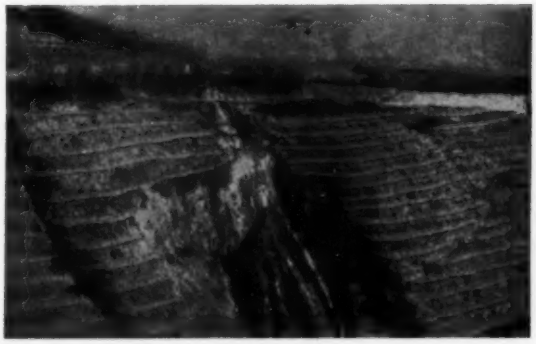
Nanyo district is the southwestern part of Shikoku Island, one of the four main islands of Japan. It is very mountainous land of about 700 square miles. It consists of rias coast, few small plains, and many hills and mountains. So that crop fields exist almost on top of hills and steep hillsides or mountains.

Steepness of slopes where crop fields lie are generally from 20 to 45 degrees and rarely over 50 degrees. The construction of crop fields is mostly bench type terrace with narrow platforms, between 2 and 5 feet wide, and unprotected earth risers, although in some part they are protected by stone wall or weeds. In some villages, weeds on risers are removed cleanly, by reason that they absorb fertilizer.

Owing to lack of catch drain, rainwater overflows from field to field. Crops, cultivated here, are chiefly barley in spring and sweetpotato in summer. In some villages, citrus fruits grow extensively.

In managing of crop fields, green manure, compost, and other organic manures are not used, although crop residues such as straw and runner of sweetpotato are utilized as "agoshiki," that is to lay them on top of riser to prevent it from collapse or waste of soil. Therefore, humus content in soil is very low.

Note.—The author is a professor at the Matsuyama Agricultural College, Matsuyama, Japan.



Eroded cropland.

In submitting this article, Professor Tsuji wrote:

Please receive this letter and report, here enclosed.

I am learning about erosion control. During the war I read "Soil Conservation" by Mr. H. H. Bennett in Tokyo, under bombing of American air forces, continued day after day, and now I read your SOIL CONSERVATION monthly at Matsuyama.

This report is written about Nanyo District which lies near Matsuyama and is one of the erosion problem areas in Japan.

I shall be much obliged, if you kindly introduce the content of this report to Americans who are interested in foreign erosion problem, through your SOIL CONSERVATION monthly.

Annual rainfall of this district is about 70 inches in mean, and intense rainfalls occur in the rainy season of June, so-called "Baiu," and in typhoon season of autumn.

Under these natural and artificial conditions, above stated, there can be seen every type of erosion. We see everywhere sheet erosion in platforms, gully and rill erosion in risers of bench terraces, and slip of crop fields covers 2 or 3 acres.

The Japanese government, recognizing importance of erosion problem, has fostered soil conservation work, since few years. Soil conservation area, established by farmers who intend erosion control of their crop fields, can receive subvention. Plan of works is designed by prefectural government engineers. Total area of soil conservation areas, established so far, is about 2,900 acres. This is about 10 percent of total steep hillside crop fields area in Nanyo district.

The conservation works in this district are mainly to build drainage channel across hillside. Channel is lined with concrete. Its cross section is rectangular. Sandbox and drop are inserted in drainage line adequately.

These works will bring good result in erosion control of this district, but it will also be necessary to protect risers of bench terraces by stone wall or useful grasses. Stone wall work is the

Crops cultivated to top of steep hill.

best measure to prevent riser from erosion, but its high cost will limit its application. Sodding of riser with low growing legumes will serve as not only erosion control measure but resource of organic matter or forage.

One of another problems in this district is that topographical condition of cropland requires very hard labor in agriculture. Owing to lack of road which can pass car, all loads such as crop yields, fertilizers, and so on, must be carried on back or shoulder, passing through steep narrow path.

It is reported that there are found many patients of neuralgia, pulmonary emphysema, humpback, etc., by reason of overwork in agricultural labor. To improve this circumstance, roads which can pass car with two wheels, and simple cables are under construction on steep hillside, here and there. Construction of roads and cables will help erosion control indirectly, by making it convenient to apply soil conservation measures.

Writer hopes that Nanyo district becomes one of the best soil conservation districts.

MAP HIS RECORD.—D. I. Ross, Jr., of Blackville, S. C., makes full use of his conservation plan map. Recently he outlined how he uses it.

He said: "The land use map with my conservation plan is something that I keep before me at all times. I have made 30 duplications of it and am setting up a file putting all information pertaining to terracing on one, liming on another, crop rotations on another, and so on. I use it to record the application of planned conservation practices as they are applied, giving date, fertilization, grazing days, yields, and similar facts.

"I sketch in amended practices as they are planned with a technician. After applying measures as shown on the map, I have noted that I no longer have the damage from erosion that I once had. This includes wind and water erosion damage."

Research Noted

By A. B. FOSTER

MORE than 400 Kentucky bankers, soil conservation district supervisors, county agents, and Soil conservation Service workers got a close look at modern farming at the 1,047-acre research station near Coshocton, Ohio.

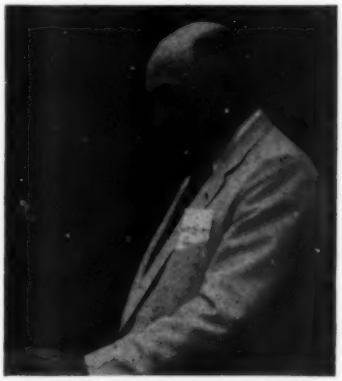
They saw a 65-ton block of earth so delicately balanced on scales that one man could tip it. The weight of this block is recorded automatically every 10 minutes. The variations in weight reflect the change in moisture in earth. They give information as to the water-holding capacity of the soil under varying climatic, crop, and tillage conditions.

The tourists heard Lloyd Harrold, project supervisor, expain such things as chopped hay mulch on corn, studies in grass waterways, and corn planted right behind the plow with no further tillage.

The Kentuckians learned that chopped alfalfa blown on corn increased the moisture content of the top layer of soil by 12 percent. It increased the corn yield nearly 20 bushels last year.

The visitors saw skim plowing that helps save soil while a pasture on a 20 percent slope is reseeded. They noted living fences of multiflora rose that hold all kinds of livestock and provide fine cover for quail and other wildlife.

The Kentucky Bankers Association sponsored the tour in cooperation with the Kentucky Association of Soil Conservation Districts.



L. M. Campbell, president of Kentucky Bankers Association, talks to touring group.

Land Leveling Moves East

Research and farmer experience show that this practice can help more farms than previously held likely.

No. 12

This is the twelfth of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

By T. W. EDMINSTER

LAND leveling and grading equipment, until recent years seen in few fields outside the western irrigation areas, is moving into many parts of the East. New research and farmer experience indicate that land leveling can improve the land on many more farms than had hitherto been thought likely.

Land leveling, or forming, is simply the grading and smoothing of an area to remove natural pockets and depressions, erase scars made by farming implements and management practices, and provide a basis for a continuous and uniform row grade. The uniform row grade aids in uniform irrigation and drainage with safe, nonerosive speed of flow. Land leveling also gives a smooth uniform surface that makes precision planting and speedier cultivation and harvesting easier. It reduces machine wear and driver fatigue.

Land leveling studies were started on sugarcane land in Louisiana in the early forties. Ditch spoil banks and the excess soil on the headlands and back furrows were used to fill major pockets and low spots. This operation was followed by precise grading and leveling to give a slope of 3 to 6 inches per 100 feet towards the drainage ditches. The result was higher cane yields. The 4-year average yield from 105 acres of average sugarcane land, that had been properly graded, showed an average increase of 5.81 standard tons of cane an acre. With the average cane price at $7.82 a ton, this resulted in a net increase of over $45 an acre. Records showed that grading average sugarcane land took 4½ to 5½ hours an acre for a cost of about $45 an acre.

Cotton drowned in depression that land leveling could correct. Such pockets make timely and efficient machine operation difficult.

These studies are being extended to other areas. For example, on cotton land near St. Joseph, La., studies in the first year indicate favorable results from grading due to removal of low spots, plus improved conditions for high speed precision planting and cultivation.

Recent studies at Fleming, Ga., and in eastern Virginia, indicate that land leveling improves drainage efficiency by providing positive drainage to the field ditches on the troublesome Bladen soils. In Virginia, first year results show that by grading to provide positive row drainage, the distance between the costly quarter drains may be greatly increased.

Note.—The author is agricultural engineer, eastern soil and water management section, soil and water conservation research branch, Agricultural Research Service, U. S. Department of Agriculture, Beltsville, Md.

Land leveling on organic soils in eastern North Carolina are also proving successful in filling the many depressions caused by old stump holes, implement scars, and uneven settling. These wet pocketed areas cause much delay and lost time in tillage, cultivating, and harvesting. Also, yield is greatly reduced because crops are drowned out or stunted in these pockets.

In the first studies it was found that there was less trash interference on the organic soils when a large rotary-type tillage tool was used about 2 months before and immediately preceding the leveling operation.

The large Hightstown Dairy at Hightstown, N. J., has for the past 4 years, used land leveling equipment in preparing its seedings of hay and pastureland. C. H. Conover, farm manager, estimates that his haying, grass silage operations, and pasture clipping programs were speeded up 30 percent on the smoothed fields as compared with those not yet smoothed. In addition to higher speed operation of equipment, there was also less machine damage and operator fatigue.

Both experiment station and Soil Conservation Service workers in Alabama have shown that land leveling principles can be used to remove small knolls and fill minor low areas so that parallel or equally-spaced terraces may be readily built on sloping fields. These parallel terraces make the use of multiple row-crop equipment easy. The smoothing operation provides a more uniform seedbed to help precision planting.

Land leveling or land forming is by no means new in the field of irrigation. Research workers and practical irrigators throughout the West have learned that surface irrigation on an area that is not leveled and graded results in great waste of water, and crop and soil damage where salinity is a problem.

These same hazards are growing in importance in the East. Throughout the Mississippi Delta large areas are being graded for furrow and border irrigation. Similar interest is developing in parts of the Coastal Plain.

For example, at Freehold, N. J. John Albis, owner of a small but intensively cultivated

Precision grading and smoothing is done by this floating, hinged type of land leveling machine.

Where shallow field ditches are built as part of land leveling, removed earth is used to fill old stump holes and surface pockets.

truck farm, is reforming his fields to use furrow irrigation. Overhead irrigation with water of high iron content has discolored his leafy vegetables. Actually, Mr. Albis is getting a double benefit. His leveling for irrigation has also removed low spots and pockets in which as much as 30 percent of a sensitive crop has been drowned out in past years.

A question is sometimes raised as to what effect the soil profile disturbance has upon crop yields. Experience has shown that in most instances the large volumes of soil needed to fill depressions can be taken from areas where the topsoil is above average depth due to development of headlands, back furrows, and spoil banks. In the few instances where topsoil is reduced in depth by the leveling operation, a well-planned soil fertility and organic matter management program, coupled with the improved drainage resulting from the leveling, quickly offsets yield decreases.

The principles of successful land leveling under Eastern conditions closely parallel those for the West. Careful topographic surveys must be made to assure precision work with the least expenditure of time and energy.

Since many of the Eastern areas involve fairly high yardage for filling depressions and lowering spoil banks and headlands, the dozer-scraper combination has been found highly effective. The dozer is used for hauls up to 300 feet and the scraper on longer hauls.

A dozer may also be used in combination with a motor grader. The grader cuts down the spoil banks and headlands and moves the material into a position where the dozer can get behind it to spread it where needed. These combinations are used for the rough grading that brings the land to within about 2 inches of final grade. Then a land leveler is used to form the exact grade and slope desired.

Under eastern conditions the floating type leveler with a hinged frame has proved best. The floating feature makes it possible for the machine to cross field ditches. The hinged frame makes it easier to handle the machine on the smaller fields found in the East.

It is highly important that grading and leveling be done when the soil is dry enough for normal tillage operations. Handling of wet soil by heavy equipment quickly causes severe compaction. For example, compaction resulting from grading a Louisiana sugarcane field when it was too wet resulted in a 50 percent drop in crop yield the first year. Only salvage cane was available for harvest the second year.

Land leveling is headed for widespread adoption throughout the East. Its growth is indicated by the use of more than 1,200 land leveling machines in Louisiana alone. One manufacturer reports sale of over 400 machines in southern Illinois in recent years. Other States report similar trends.

There will be a growing interest in, and demand for, land leveling as current research programs report their findings. Of particular value will be facts on the economic and physical limits of the practice.

Two things will influence the adoption of land leveling as a standard farm practice. They are (1) wider experience on techniques of soil management to offset the effects of intensive soil handling; and (2) more facts on the value of land leveling in solving irrigation, drainage, and other soil management problems.

DISTRICT PROFILE

G. MARION HINCKLEY of UTAH

G. MARION HINCKLEY has needed only a few years to change 500 acres of swamp and flooded land into a high-producing dairy and grain farm. A sound, well-planned soil and water conservation program has been the key to his success.

In 1945, as an Extension Soil Conservation Service demonstration farmer, Marion Hinckley led the way toward the organization of the Timpanogos Soil Conservation District in Utah County, Utah. When the district was organized in 1947, he followed through as the No. 1 cooperator and a district supervisor. He is now president of the Utah State Association of Soil Conservation Districts. Through a dike and drainage system, Hinckley has converted 250 acres of swampy wet land into 50 acres of alfalfa, 20 acres of silage corn, 45 acres of barley, oats, and wheat for feed mixture, 87 acres of improved pastures, a 2-acre fish and water storage pond, and plenty of land for feed lots, barns and 2 homes.

In the early 1930's when Marion Hinckley took his farm over, less than 65 acres were being used. It was low-producing farm and pastureland.

The Hinckley holdings border Utah Lake 3 miles west of Provo. All of the land has been flooded from time to time, depending on the lake's water level which is controlled by spring snow runoff and summer rains.

By dike and pump, Hinckley has slowly pushed the shoreline farther and farther out. Now 300 acres are behind the dikes; another 200 acres extend out into the swampy shoreline. As he says: "Work for my boys to do when they take over and help build more good land for the people of America."

A 125-head dairy herd of Holsteins roam the pastures and fields. Hinckley maintained a milking herd of sixty-five 428-pound cows for the 1954 testing year. "We are now pushing away over the 428-pound production per cow," Hinckley said recently.

G. Marion Hinckley.

The milking herd uses 6 pastures of 4 acres each with a mixture of alfalfa, clover, smooth brome, orchard and alta fescue grass. The cows are on a rotation of 4 days grazing per pasture, clip, an irrigation, and on to the next pasture. This rotation allows 24 days for regrowth. Cool water of even temperature is always within a short distance in both summer and winter. Nearness of water promotes cow health and aids in high production. The young stuff and 10 head of horses graze a 65-acre pasture.

The corn field produces 18 tons of ensilage an acre. Barley, oats, and wheat make 75 bushels or better. Alfalfa cuts 5 tons an acre and up on 3 or 4 cuttings a season.

The Utah farm is both surface and subirrigated. Hinckley controls the water table by 1,500 feet of dikes, 11,000 feet of ditches, many drops and gates, and a pump. He has leveled 88 acres and laid 200 feet of pipeline. Ditches and borders supply and control the surface irrigation waters.

He raises all the feed for the dairy herd on the farm excepting a little supplement.

The Hinckleys have 5 children, 3 boys and 2 girls. Phillip, 18-year-old FFA member, received the Utah Junior Farmer award for 1954. Twenty-one-year-old Thomas K., eldest son, is on a church mission in western Canada for the Church of Jesus Christ of Latter-Day Saints.

Marion Hinckley, as well as being a busy and progressive farmer and soil conservationist, takes time out to serve his church and state. He is a retired bishop of his church and member of the High Council West Utah Stake. He is a member of the the State Soil Conservation Committee, the Provo Planning Commission, the Farm Bureau, and the Provo Chamber of Commerce. He is a director, Utah Federated Milk Producers Association, a leader in flood control work, and manager of his church stake farm. While Bishop of the Sunset Ward he directed the building of the first new chapel in Provo in 20 years.

A modern home for his family, a second for his dairyman, a new, módern milking parlor, a 1,000-gallon milk cooling vat, and loafing barn grace the Hinckley farmstead from which 2,000 pounds of grade-A milk go to market each day.

—RALPH FELKER

Small Unit Is Success

By JOHN BONOMO, JR.

CONSERVING the range on small farm and ranch units has been a problem in New Mexico. But maintaining range in top condition has proved profitable for Noel L. Burton of Solano.

Burton has a grade herd of shorthorn cattle. He sells calves. He's a cooperator and supervisor of the Mesa Soil Conservation District.

Burton owns and operates 1,600 acres, with 320 acres in cultivation. He has maintained the fertility of his soil to produce good crops. He keeps organic matter in the soil so it will absorb and hold moisture. This practice helps to reduce wind erosion and keeps a supply of plant food in the soil for crop production.

Note.—The author is work unit conservationist. Soil Conservation Service, Mosquero, N. Mex.

Noel L. Burton (standing) uses crop stubble to help control wind erosion.

Burton leaves crop stubble on the field to help reduce wind erosion and hold moisture. He holds his stocking rate to a conservative number, normally above 30 acres to the animal unit yearlong.

Burton has four separate pastures on which he has been practicing deferred grazing for years. This practice provides a large volume of winter forage. In this way he avoids having to produce or purchase large amounts of feed to carry his livestock through the winter.

The value of Burton's conservation program is reflected in their modern home and other improvements, and their latest type of farm machinery. In addition, they have raised and educated four children.

NEW HAMPSHIRE INCIDENT

(Continued from page 148)

Of course we know some of the background of this unique event. Both Mrs. Abbott and Mrs. Gerrish have twice attended the annual summer conservation workshops at Lost River Camp. This admirable project of the Society for the Protection of New Hampshire Forests has frequently called on SCS and other agency specialists for guidance in the 1,000-acre "classroom"at Woodstock.

But the two teachers had taken more back to their school than their conservation instructors ever hoped for. Their own ingenuity must be credited with their success in introducing resource-appreciation into practically every branch of the curriculum.

Water Use and Water Rights

Local individuals and groups are taking initiative in seeking fair, lasting solution of grave problem

By C. E. BUSBY

IT was at a Bowie, Ariz., Civilian Conservation Corps camp, near the head of San Simon Creek, that I first fully awakened to the importance of water rights on the state and local scene.

A group of us were attending an outdoor workshop on watershed planning. It was in the early 1930's. It fell to my lot, without warning to state the general plan of our planning party. Here's about what I said:

"Each soil type and subwatershed is entitled to that portion of the precipitation and surface runoff as may support a protective and sustaining plant cover, guarding against erosion and economic loss to the rancher. The remainder of the runoff which finds its way into stream channels and to which others have rights of use must be allowed to pass on so the irrigators, communities, and states below will be able to use their fair share, the water to be as free as practicable of sediment."

That was quite sweeping and general, but it served the purpose!

Little did we realize then that ground water at great depth would produce cotton on a large scale and support a larger community at the Bowie crossroads in 1955.

Little did we realize that the concept of wise watershed use and management would some day be a land and water policy of the nation. Nor could we visualize then that locally governed soil conservation districts would later be a guiding influence in applying this policy.

Today, people in many states, East and West, are examining existing water policies to see if they are geared to growing populations and to expanding industrial, agricultural, and recreational water uses.

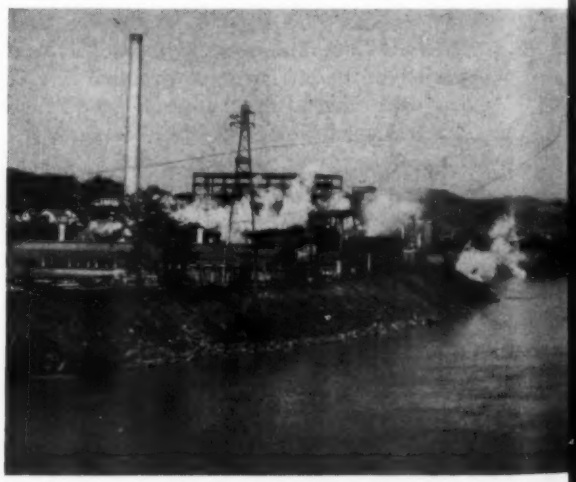
As state leaders study local and statewide water use problems, they find many questions of public policy that strike them with sledge hammer force. Some questions have no ready answers! A few seem to have but they are slow coming to the surface.

First, what is the core of our water use problems?

It centers on local water shortage and lack of availability in most states. Water is not available if it is polluted, or too deep in the ground, or if it is at hand at the wrong time. The important point for consideration is an adequate supply of usable water at the time and place where needed most. This local shortage situation may be on the farm or in the factory or town but often involves the small community watershed.

Second, is the nature and extent of water usage different from what it was in 1935?

It is quite different. Requirements are greater now. And there are many more water users and many more uses for water. For example, 100-bushel corn takes a lot more water than 40-bushel corn. And at critical growth periods. So it is for many items of production.



Modern industry, like this West Virginia ch plant, u

Note.—The author is water rights specialist, Soil Conservation Service, Berkeley, Calif.

The American people have done wonders in industrialization, based largely upon water use. They have done such a good job that water now is a principal limiting factor to future economic expansion in certain localities.

Third, what is the significance in light of modern needs, of water supply measured in terms of average annual rainfall and streamflow?

Average annual supply figures aren't enough! We have to consider available supplies and needs with reference to soil moisture deficiencies, ground water and streamflow deficiencies, reservoir and snow storage deficiencies, and any other factors limiting local supply when water is needed most. Figures for the typical dry year might afford a useful index.

We must also recognize demand itself and pollution as affecting availability of water for use. The whole subject of net water availability to meet increasing demands over the years is as vital to the farmer and soil conservationist as it is to other users.

Fourth, are supply factors the same over the nation?

Factors vary from North to South, East to West, upland to lowland, community to community, and even soil type to soil type. Each state is a pattern of problem areas determined by characteristic supply factors. But shortage may be a common denominator cutting across problem areas and state lines owing to predominance of certain factors.

Fifth, is water supply related to legal rules as to rights of use?

When the supply is enough for all needs there is little competition for and conflict over water use. Less is then required in the way of regulation by law except as regards water damage.

But when the supply becomes less than the need, such as to adversely affect economic enterprises, means for providing a fair division among all users are important. One means is conservation by structures and good land use on a watershed basis.

Another means is a system of law providing rules of guidance in stream development and use helpful in getting the most beneficial use of water and in avoiding or settling conflicts of interest over division of supplies.

Physical and legal means ought to go hand in hand so that a wise balance between natural and interrupted streamflow may be achieved. One means without the other may not be enough.

Sixth, is it possible to develop a system of state water law to help meet present and future needs of localities as well as state as a whole?

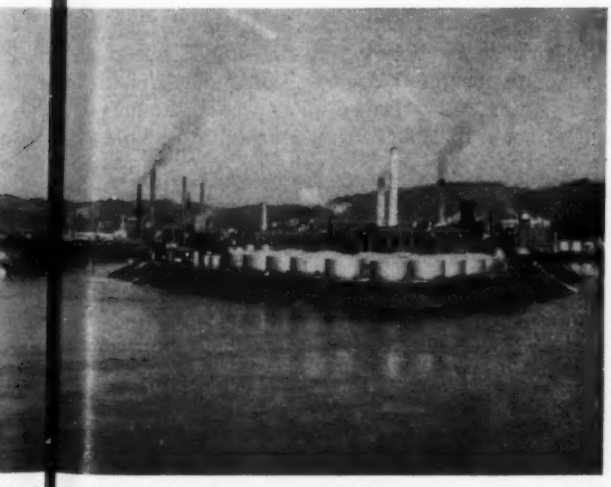
As yet, there are no readily acceptable overall solutions for some states. Much depends upon the seriousness of water shortages and growing demands of users in one or more local problem areas in each state. Much depends upon the attitude of established users, especially those requiring continuous streamflow.

Conditions in critical areas indicate the need for change. Necessity often provides the driving force among leaders seeking improved legislation.

Seventh, what is being done about our growing water use problems?

Many groups are working to find suitable law and program answers. In addition to citizens' committees, state study commissions and waterboards, these groups include the National Association of Soil Conservation Districts, several colleges and universities, Council of State Governments, Conservation Foundation, American Bar Association, National Reclamation Association, American Farm Bureau Federation, Izaak Walton League, and the National Watershed Congress.

Eighth, are there ideas that will stimulate further discussion and study on this subject?



nia ch plant, uses a tremendous amout of water.

Here are a few broad suggestions.

Western States have learned by long and costly experiences that a quantitative guide to the conservation and division of surface waters in short supply is fair and practical of administration for most conditions. The average western water user and administrator has confidence in this system which helps the application of engineering and legal principles to water use problems.

Some leaders feel that the western system of prior appropriation is too rigid. That there is too much emphasis placed upon security of investment and statewide control of development and use. That the system is not flexible enough to allow reservation of supplies to meet future needs, especially for nondepleting uses of fish, wildlife, and recreation.

But many leaders seem to go along with the aim of western water law that encourages conservation. Their main question seems to be how this aim can best be attained.

Some students of western water law believe that the system needs strengthening, particularly as to standards of beneficial use in their relation to land use and soil conservation, reservation of supplies to meet future needs, and methods of administration. Western legislatures and water agencies are working progressively to accomplish these things. South Dakota has recently revised its water rights code. California is moving toward the establishment of a new overall Department of Water Resources to cover all aspects of water.

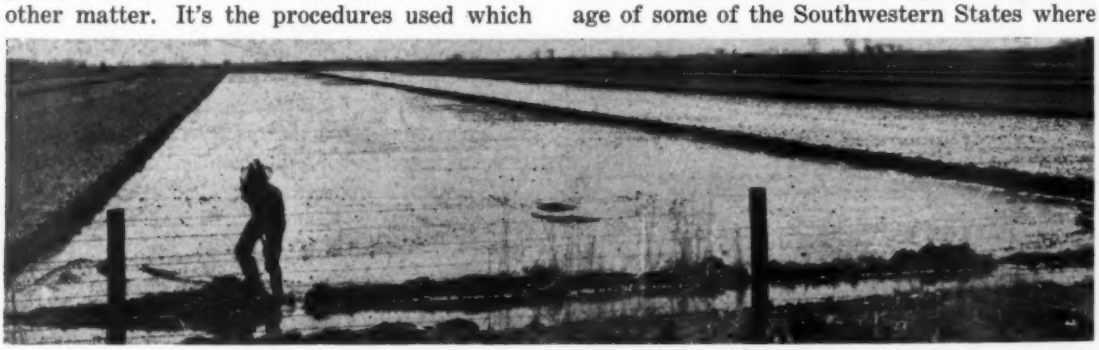
Several Eastern States have adopted elements of water policy similar to those in the West, though there is wide variation. But to put such policy into effect in the Eastern States is another matter. It's the procedures used which raise major points for discussion, especially as to how far natural streamflow should be interrupted to permit greater storage and depleting uses.

States to the north, having somewhat more dependable water supplies and somewhat less demanding climate, such as those around the Great Lakes and St. Lawrence River, seem to have been moving in past years toward a statutory permit system to control new consumptive or depleting uses with limited change in the existing common law. This tends to emphasize lands touching defined water bodies and uses which do not deplete streamflow. It is recognized that maintenance of streamflow and lake levels is important to existing nondepleting uses in some of these states.

But drought and expansion of water uses in recent years, especially in States like Michigan, Ohio, Kentucky, and Indiana, have focused attention on the needs of new as well as existing water users, particularly cities and irrigation farmers. Indiana is taking concrete steps to meet this situation by seeking reasonable adjustments in the common law.

States to the south, with somewhat less dependable surface water supplies in the critical season of need, more exacting climate, and rapidly growing demands for water, have done little about their water laws until recently. Now some of them appear to be seeking a system of statutory permits involving moderate changes in the common law of stream development and use which will facilitate greater storage and depleting uses but protect existing lawful uses.

In this connection it may be noted that the acreage of irrigated lands in Louisiana, Arkansas, Florida, and Mississippi approach the acreage of some of the Southwestern States where



Border irrigation in Colorado. Crops are taking increasing amounts of water as irrigation spreads even to humid areas.

irrigation has long been a common practice. This requires a large seasonal consumption or depletion of streamflow and ground water. This and other trends may call for physical and legal solutions similar to but not necessarily identical with western principles.

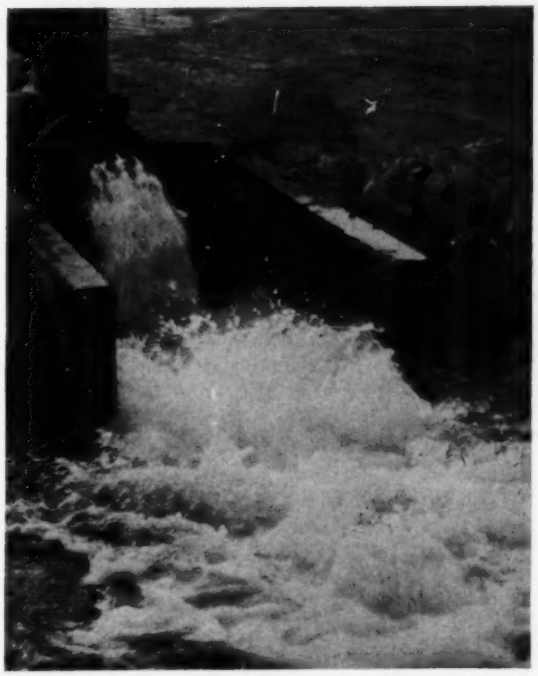
Perhaps the pattern of water uses and supplies may determine the type of common and statutory law combination that will finally emerge in each Eastern State. (The term "pattern of water uses and supplies" is used here to mean the particular combination of two or more of the four principal water uses—agricultural, industrial, municipal, and recreational—in its relation to climate, streamflow and ground water). This seems to have been the trend over the nation from our early history. The use and supply pattern is much different in Florida, Mississippi, Ohio, West Virginia, and Iowa. The crux of the problem is the competition between the old nondepleting uses and the new depleting uses.

Last, are there guideposts that may be helpful in seeking solutions?

Yes, there seems to be a number.

As opposing uses come more into conflict, some sort of quantitative guide is required which encourages storage, conservation, and fair division of the supply among all those in need, yet protects all lawful existing uses. Thus, statewide administrative control of development and use seems necessary in some Eastern States to assure application of such a guide. Streamflow isn't confined to counties either. But before statewide control can come about, the major water use groups properly insist that they have an important voice in administration of control policies.

Another guidepost is that minimum flow required to serve domestic, fish, recreation, and industrial and municipal waste disposal purposes should not be unduly interrupted or tapped for new depleting purposes, except in emergencies or under special circumstances. This would seem to call for statutory limitations on diversions and uses and the coordination of quantity and quality control measures exercised by state waterboards. A system of special permits might serve this purpose. It also calls for reduction in discharge of sediment and other wastes at the sources and, where practicable, increase of low flows by upstream reservoir releases. We must guard against making existing pollution problems worse; we must seek fair means for their solution.



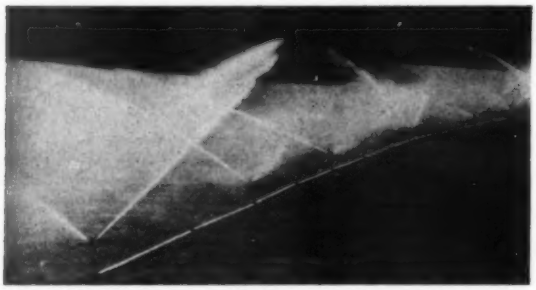
Texas irrigation well gushing 4,000 gallons of water a minute.

Flood flows can be tapped for all types of uses, with fewer complications arising. This begins with the capture and wise use of diffused surface runoff on farms and in small watersheds having due regard, however, to the rights of downstream users. It continues where practicable by control, development, and wise use of flood waters after they have entered stream channels. Some system of statutory permits would seem to be required. Perhaps those who invest their funds in these endeavors ought to have rights in and to the increased storage and streamflow in proportion to their investments.

Development and use of normal streamflow might be approached with caution to assure full protection of established lawful uses as new uses expand. Much untapped or unused normal flow can be put to use, otherwise it may continue to waste into the sea. Some can be reserved for future uses within or among the watersheds of origin. Perhaps a system of temporary use permits would serve the purpose of controlling but encouraging new depleting uses until a sys-

tem of permanent permits seems feasible and desirable. If so, the period of permitted use should bear a realistic relationship to the time required for amorization of investments in new water developments.

As to ground water, the States seem to be progressing toward a local control system authorized by state enabling legislation and referenda. This appears to be a healthy trend, for it recognizes the importance of local control to meet variations in geology, ground water supply and replenishment, and land and water use. But it is slow in coming. More understanding of ground water is needed if local leaders are to assume their proper responsibilities in this field.



Connecticut pasture gulps huge swallows of irrigation water.

One of the major gaps in the field of water law and administration is the lack of efforts to seek a unified approach to surface and ground water control and to quantity and quality control.

We know that the normal flow of streams is supplied largely by ground water. (Normal flow includes minimum flows but not the flows resulting from runoff). We know that most of our ground water originates with precipitation which soaks into the soil and then trickles down into the underlying rocks. The development and use of one source of supply may affect other sources. Yet this is not adequately reflected in our water law systems, especially in the old common law. Nor in recognition of the interdependency of agricultural and nonagricultural uses dependent upon these related sources of supply.

The reduction of normal flow may result in increased concentration of pollution wastes harmful to fish, wildlife, livestock, human beings, and other users. Increase of normal flow may have the reverse and beneficial effect. Economics is involved in these relationships. Yet our systems of water law and administration do not reflect this relationship enough. Responsibility is not properly placed in some states to assure coordination of control efforts.

However, there are encouraging signs in a few states. Broad support for the proposal to establish a new Department of Water Resources in California is recognition of the need for unification.

In South Carolina and Mississippi the water study commissions have recognized the need for a unified approach more in harmony with the water cycle and the influence man has upon it.

We all need to put more effort into furthering these broad objectives—not for the sake of seeking more controls but rather to help make minimum controls and maximum voluntary cooperation more effective and economical.

New developments in the field of water law and administration call for original thinking and fresh ideas, for water is vital to our economic progress and modern life. But these new ideas should be tempered with the full background of all our American experience, legal and nonlegal, East and West. These steps can best be served by tapping the judgment of local leaders.

In many states local leaders—lawyers, engineers, bankers, farmers, teachers and legislators—are studying water-use problems, analyzing their findings, and recommeding solutions. Clair Guess of South Carolina, Sam Thompson of Mississippi, Box Tsinger of Georgia, Dave Weaver of North Carolina, John Sims of Ohio, Anson Thomas of Indiana, Marvin Melton and Joe Barrett of Arkansas, Harry Rieck of Maryland, Wheeler Milmoe of New York, Joe Prendergast of Iowa, and Francis Lindsay of California are just a few of the many able leaders devoting much time and effort to this problem.

Soil conservation districts, state farm bureaus, and other state and local organizations are taking the initiative for bringing together leaders from all water-using groups and legislative assemblies in joint study of this common problem.

Cagney Turns To Hardy Cattle

By EZRA I. SHAW

JAMES CAGNEY is convinced that Scottish Highlander cattle are the kind of beef animal he wants on his Martha's Vineyard, Mass., farm.

In trying out the Scottish Highlanders, the popular actor was seeking a breed of beef cattle that could stand extremes of cold and dampness. He thinks he has them. Listen:

On last winter's coldest night, with zero temperature, one of Cagney's Scottish Highlander cows dropped a calf on the frozen pasture. Didn't even bother to come into the barn.

When Paul Mayhew, then farm manager, checked up the next morning, he found the cow and her calf doing okay.

"Those Scottish critters don't even come near the barn," Mayhew said. "That's all right because it saves a lot of barn work. And the cattle don't mind—they want to stay out. They browsed all winter long on the ends of brush. And by golly they looked just as good at the end of the winter as they did at the start. And all we fed them was a quart of grain apiece daily and some poor quality hay. Those babies can take it when it comes to cold and thick, foggy, penetrating dampness."

Starting with two cows, a calf, and a bull, Cagney is building up his Scottish Highlander herd gradually. He is increasing his herd as he improves and develops his pastures and meadows to feed more cattle.

Note.—The author is work unit conservationist, Soil Conservation Service, Vineyard Haven, Mass.

These cattle can take a lot of cold.

Paul Mayhew (right), then farm manager, and Ezra Shaw, SCS technician, inspect birdsfoot trefoil and bromegrass seeded as part of pasture improvement plan.

Cagney has had his island farm since 1926. In 1952 he became a cooperator with the Dukes County Soil Conservation District. As a cooperator he agreed to give his land all the soil and water conservation measures needed to prevent erosion and improve the soil for greater production.

In 1953 the district supervisors awarded Cagney a silver cup for his conservation work.

Whenever he can get away from Hollywood, Cagney takes a hand in running his 200-acre farm. The Soil Conservation Service has helped him on technical matters.

Cagney has been building up the usefulness of his farm by liming, fertilizing, and seeding his fields to good grazing and hay crops. Scientific soil tests tell him how much to lime and fertilize.

This example shows what Cagney has been doing: In one unproductive field he planted winter rye and vetch. The next year he made it into a profitable meadow by planting a mixture of 3 pounds of red and 12 pounds of alsike clover and 10 pounds of bromegrass an acre.

With calf born outdoors in zero weather, Cagney cattle graze native pasture.

At seeding time he put down 600 pounds of 8-16-8 fertilizer an acre. He topdresses the field each year with 600 pounds of 0-15-30. He keeps lime content up to the level figured best for the grass and clovers.

Cagney has also improved his pastures by liming, fertilizing, and planting them to top-quality grazing grasses and clovers. He has cleared brush and boulders to turn idle fields into profitable grazing and hay. He has built ponds to provide water for livestock, fire protection, and recreation.

In carrying out the woodland improvement part of his conservation work, Cagney has removed low-quality trees. This gives the high-quality trees a better chance to develop into moneymaking size. He has planted various kinds of valuable pines to fill gaps in his woodlands. Idle, bare spots best suited for woodland also get planted to trees.

RECOGNITION FOR TWO. — For "distinguished achievement in soil conservation" honorary memberships in the Missouri Association of Soil Conservation Districts have been conferred on Kenyon G. Harman, of the Soil Conservation Service, and Charles C. Clayton of the St. Louis Globe Democrat.

The awards were made in August at a banquet in Hannibal, Mo., by Henry Blesi, past president of the State Association and chairman of his own Franklin County Soil Conservation District.

Harman has devoted his life to agricultural work, starting with the Soil Conservation Service when it was first established in 1933.

Clayton was cited for his direction of a Soil Conservation Awards Program in Missouri, which is now concluding its fourth year of activity.

ENRICHES LIBRARY.—Supervisor George Patrick of the Orangeburg County (S. C.) Soil Conservation District presented $50 worth of additional literature to the Orangeburg Free Library at the conclusion of the Smokey Bear Vacation Reading Club. The club was sponsored by the library, South Carolina Commission of Forestry, and the district.

It was reported that 1,000 children used conservation reading matter previously given to the library.

REMINDER—Friends of conservation can make *more* friends by giving subscriptions to this magazine; price $1.25 per year, from the Superintendent of Documents, Government Printing Office, Washington 25, D. C.

The Springs Run Again

By ARNOLD W. PITMAN

WHEN Edson Gifford was a young man on his farm near Randolph, Vt., hillside springs supplied his household water needs. But along about 1925 or 1926 the springs began to dry up every summer. Gifford had to haul water.

The only thing that had occurred in the meantime was that the hillside had been laid bare. All the trees had been removed to make a pasture. The pasture never was worth a hoot.

Now the springs are running again. All year long. Cool, fresh, and clear. And the only thing that has happened in the meantime is that Gifford replanted the hillside with trees. Trees that have commercial value. Trees that will add to farm income.

Gifford has been reforesting other hillsides of his farm. His tree planting has improved not only his own place. It has brought benefits to a neighboring farm.

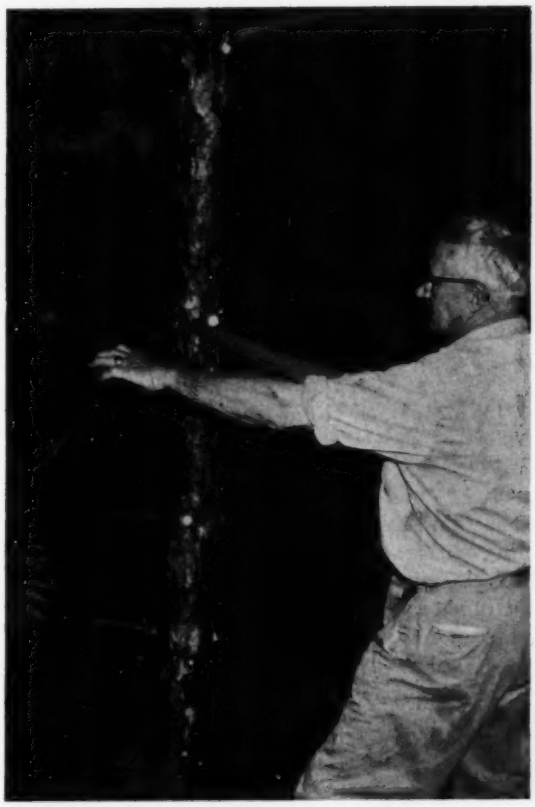
"Before I put trees on a hillside that drains into my neighbor's farm, he used to get a flash runoff every spring," Gifford explained. "Often the runoff damaged his place. Like the year it took his farm pond out. He told me the other day that he doesn't have runoff trouble anymore—not since the trees got their root systems down and litter made a cushion on top of the soil. Besides, his whole moisture situation is better."

When Gifford began his tree replanting work a dozen years ago, the hillside was bare and bleak as a new battlefield. It had been badly eroded by years of exposure to rain and snow and runoff.

Today you wouldn't recognize that hillside. Under Gifford's careful managment, the plantation has prospered. You'll see no bare spot on that hillside now.

The original plantation was ready for its first pruning last fall. In another 10 years, barring fire, disease, and other calamities it will be ready for its first pulpwood thinning.

Note.—The author is work unit conservationist, Soil Conservation Service, at Randolph, Vt.

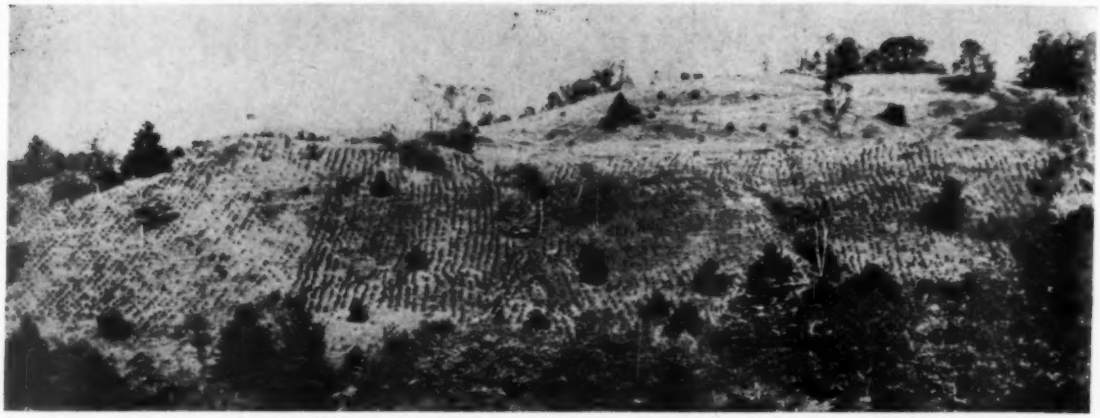


Edson Gifford pruning his woodland.

"I planted the trees in the first place to stop erosion," Gifford said. "The hillside was no good for grazing—it didn't produce enough forage. The topsoil was being washed down the slope. Two gullies had started and they were getting big fast. When I was a boy, there was no sign of a gully.

"I've stopped the erosion. That was my first concern. The running springs are just a bonus for good farming, I figure."

"Of course the main thing is that I put my land to its best use. That's the basic conservation principle: putting your land to its best use or, as we sometimes say, using your land within



Springs were summer dry at this time, soon after Gifford replanted bare hillside. (Photo reprinted from *Esso Farm News*).

its capabilities. And giving it whatever treatment it needs to protect it against erosion and to improve its fertility or productiveness."

Gifford speaks with authority on the conservation program. He has been a member of the broard of supervisors of the White River Soil Conservation District since its formation early in 1940. He has been its chairman for the past 10 years. As such, he shares responsibility with the other four supervisors in directing the district's operations.

Gifford did not stop with his first planting of trees on his steep slopes. He has continued to plant trees every year since then.

That first hillside planting covered 35 acres. He has since planted 45 acres more. He has also filled in empty spots in his woodlands. In all he has put out well over 100,000 seedlings. In planning his woodland work he has had the help of Soil Conservation Service technicians and foresters from the Vermont Department of Forests and Parks.

"I have 50 acres to go," Gifford said.

The trees in the first plantation are 15 to 20 feet high. They average 4 to 6 inches in diameter. They are mostly red and white pines. Some Norway spruce and Scotch pine.

Gifford thinks that he himself may not reap any cash benefits from his trees. But he figures his children and grandchildren will. He has a son and 2 daughters, 5 grandsons and 2 granddaughters. His son, Edson, Jr., teaches agriculture to GI's. He's a World War II veteran, a lieutenant colonel in the Air Force Reserve. He helps his dad on the farm as much as his teaching job permits.

"I'm hoping he'll take over completely this year," Gifford said. That would make it a third-generation farm.

Same spot 10 years later. Hillside is again covered with trees and springs are running year-round once more.

Methodists Consider the Land

"This subject is as important as God and the Universe, because we are all dependent on food and land for life itself."

SO SPOKE Bishop H. Bascom Watts of Lincoln, Nebr., in opening discussion at one of the 16 group meetings of the National Methodist Town and Country Conference at Bloomington, Ind., last summer.

The subject was "Land, Food, and the World Situation." T. S. Buie, State Conservationist, was study leader.

After four sessions with professional soil conservationists and laymen participating, recommendations were made to guide the Methodist Church in its rural activities during the next 25 to 50 years. They included—

1. A long-range program of teaching stewardship of the land and natural resources.
2. Emphasis on and support of forces working in the field of land and food.
3. Enlistment of agricultural and home economics students as agricultural missionaries for service at home and abroad.
4. Close cooperation with workers in the Soil Conservation Service, Extension Service, vocational agriculture, vocational homemaking, and voluntary organizations such as the Farm Bureau, Grange, and Farmers Union.
5. Use of Rural Life Sunday and harvest festivals to emphasize stewardship of rural life, using the resources of all rural groups in developing programs. It was suggested that the church cooperate with soil conservation districts in utilizing Soil Stewardship Week prior to Rural Life Sunday on field days for ministers.

The first session had Gladwin E. Young, deputy administrator of the Soil Conservation Service, as panel leader. The second dealt with "Food and National Welfare," in which Alexander Nunn, executive editor of *Progressive Farmer*, was leader. Raymond W. Miller, consultant to FAO, was the leader of the third study session, which considered "Land, Food, and the World Situation."

With the first three meetings as background, the study group in its final session sought answers to the question "What Can We Do About the Problem?" Dr. Ralph A. Felton, Drew Theological Seminary, Madison, N.J., was the leader.

The discussions clearly recognized that proper land use and food distribution are keystones to world peace. As one member put it, "If food does not cross borders, then soldiers will."

Panel members included such widely-known soil conservation leaders as W. F. Hall of Sparta, Ga., representing the National Association of Soil Conservation Districts; J. B. Douthit of Pendleton, S. C., oldest soil conservation district supervisor in length of service; and T. T. Traywick, Methodist layman and cooperator with the Orangeburg (S. C.) Soil Conservation District.

Approximately 1,600 delegates—full-time religious workers, laymen, and laywomen from all over the country—attended the 4-day conference. In addition to the sessions of the 16 study groups, there were meetings in which all delegates participated.

PREFER DRY FEET.—Mr. and Mrs. Allan J. Huggins, who live on Back River Road in Dover, N. H., have solved a vexing problem in growing a living fence of multiflora rose. The Huggins, cooperators with the Strafford County Soil Conservation District, take pride in growing good living fences. But some of their land is heavy, poorly-drained soil in which multiflora rose ordinarily makes unsatisfactory growth. In such places Huggins has used a rotary tiller to throw soil against the base of the rose bushes until a ridge is formed.

The roses respond to dry feet by better growth. Huggins planted a new fence last year. Prior to planting, he bedded the wetter sites up about a foot. After settling, the beds provided a site that was drained well enough to assure good growth of multiflora rose. In a year the planting was more than 3 feet tall.

Huggins cultivates his rose fences with the rotary tiller. He fertilizes and mulches them. He uses poultry manure for fertilizer. That, according to studies at Cornell University, has proved the best kind for strengthening weak areas in multiflora rose fences. The Huggins' excellent care of their living fences has produced vigorous growth, ornamental beauty, and is attractive to birds.

—FLOYD V. BARKER

An Early Conservationist

AT one time he was one of the largest landowners in the country, owning some 50,000 acres of land. Some of this was in joint ownership on the present site of Oriskany monument in the Mohawk Valley, N. Y.

He adopted the "live fence" to protect his woodlots, but wrote that he was convinced "no hedge will do—where two- or four-footed hogs find it convenient to open passage."

He recognized corn and tobacco as soil removers and complained in a letter in 1795 that "neither my overseer nor managers will attend properly to anything but the crop they have usually cultivated; and if there is the smallest discretionary power allowed them they will fill the land with Indian corn although even to themselves there are the most obvious traces of its baneful effects."

He gave up the cultivation of tobacco entirely and tried to limit the growing of corn. He used his steeper lands for woods and pasture, and worked out a system of cover crops.

At the time of his death he was following a 7-year crop rotation which was well adapted to sustain and hold his soil. He noticed that the one-crop system resulted in gullying in fields, but failed to recognize that the more subtle sheet erosion was causing him more damage than the gullying.

He gave minute directions for repairing these gullies—first filling them with trash and brush and seeding them down with grass and a grain. He topdressed the seeding with manure. He also collected honey locusts and planted them along deep gullies to enable the roots to hold the soil in place.

He went so far as to dig and haul silt and mud back up the hills to fill the gullies they came from.

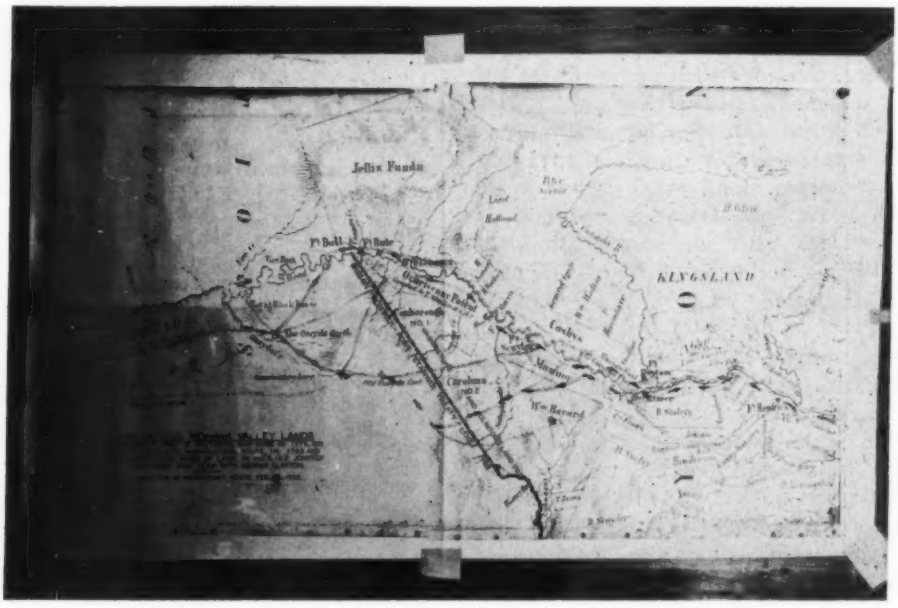
In doing all of these things he was constantly at war with custom, superstition, ignorance, and human cussedness.

His agricultural experiments led Thomas Jefferson and others to adopt a "contour' cropping system some 15 years after his death.

Who was this farmer, this experimenter, this soil conservationist who was so much ahead of his time?

We call him GEORGE WASHINGTON.

—FRANCIS E. MULVANEY



TOPSOIL AND CIVILIZATION: By Tom Dale and Vernon Gill Carter. 270 pp. Illustrated. 1955. Norman, Oklahoma: University of Oklahoma Press. $3.95.

I think I like this book because it is neither complacent nor frightening. It has purpose but no mission. It is factual.

Most conservationists know that there is a relationship between Man's destiny and his use or abuse of soil. What this new volume does is to comb the evidence and weave it, strand by strand, in a strong and convincing rope of logic.

The book makes no pretention to original research. But it has been years in the making. It is the result of vast labors in libraries, in correspondence, in examination of published and unpublished data, in personal observations and meticulous note-taking. There has been much weighing and measuring and balancing. Many ingredients have gone into the final distillation. The result is a tremendous story which should be *required* reading in the schools and *desired* reading everywhere else.

I think I like this book, too, because it is well written, well arranged, well illustrated, and well printed. That's a lot of "wells" which add up to pleasant reading. An important book such as this is doubly effective when made pleasant to the eye and hand and easy to read. The authors not only are men of the classroom, they also are men of the land. They tell and teach without pedantry.

In the opening chapter it is stated: "With the advent of civilized man, about six thousand years ago, the soil-building process was reversed in most areas where he resided: the quantity and quality of soil and the amount of life the soil supported all began to decline." I suspect that is the sentence which sets the theme for the book. It also sets the stage for quibbling and controversy, for there are a few hardy dissidents among our scientists who are still unwilling to accept the historical record.

The larger attention is devoted to a review of what has happened in the Nile Valley, Mesopotamia, the Mediterranean region, the countries of the Near East, North Africa, Italy, and Sicily. There is a chapter dealing with western Europe, another with Far Eastern areas, and still another, of course, with the United States. It is by no means a completely tragic story of land depletion and decadent civilizations, for this book is as modern and realistic as hybrid corn or the soil conservation districts. What *is* happening is as intrinsic to the tale as what *has* happened. There are maps and photographic illustrations in generous numbers, placed with the text for the convenience of the reader rather than grouped together for the convenience of the publisher.

Dale and Carter have produced a thoughtful history of human society as it has developed or destroyed itself by its use or misuse of the land. This kind of history is with us today, as we strive the world around to nurture our teeming millions and to meet the increasing needs for food and fiber. It is a timely and urgent, but not impatient, book. It offers wisdom rather than panaceas. Conservation, it declares, "is largely a way of thinking and a way of living. It is as fundamental as honesty and thrift, and it must be achieved in much the same way . . . through universal education . . ."

—WELLINGTON BRINK

WATER—THE YEARBOOK OF AGRICULTURE. 751 pp. Illustrated. 1955. Washington 25, D. C.: U. S. Government Printing Office. $2.

THE United States Department of Agriculture yearbooks have provided much information that has been helpful to the public. Many believe that the yearbooks "Soils and Men," "Climate and Man," and "Grass" are truly great books in the field of American agriculture.

To this select group can be added the Yearbook of Agriculture for 1955 "Water," which has just been released.

In the yearbook preface Editor Alfred D. Stefferud observes: "There's a lot to be known about water. We know the symbol of water but little about its properties, which can make us comfortable or uncomfortable, rich or poor, secure or insecure. We cannot live without water; we could live better if we knew more about it."

The yearbook "Water" contains the greatest amount of useful information on water that has ever been assembled into one volume. In its pages 95 topics have been covered by the best talent available in the Department of Agriculture. These scientists have concentrated on the following broad subjects on water: Our Need for Water; Where We Get Our Water; Water and Our Soil; Water and Our Forests; Water for Irrigation; Water and Our Crops; Our Ranges and Pastures; Gardens, Turf, and Orchards; Drainage of Fields; Water and Our Wildlife; Pure Water for Farms and Cities; and A Look to the Future.

A large part of the text is directed toward the conservation aspects of water. There's much execellent material on water conservation problems and practices for land used for crops, range, forest, and wildlife. Watersheds—big and little—are highlighted and discussions cover matters of legislation, laws and programs for conservation treatment, including flood control and watershed management.

There's some information on different types of flood damage that is not generally known. For instance, the average upstream damage is about 545 million dollars annually. Sediment damages also amount to 100 to 130 million dollars a year.

A big part of the damages in headwater valleys is agricultural—nearly 70 percent of the total. About 45 percent of the damage is to growing crops, pasture, and range. Damage to land in the valleys is especially significant from the viewpoint of total agricultural resources because the land in the flood plains of creeks and rivers usually is highly productive. Destruction of agricultural property along upstream areas is about 15 percent yearly.

Annual destruction in major river valleys is 500 million dollars, of which 165 million dollars is agricultural damage. Downstream sediment damage is about 28 to 30 million dollars per year. Sediment damages usually are non-agricultural.

There is little on the subject of water that the yearbook "Water" fails to cover at least in some degree. If you go in for water-witching, there's a chapter that will interest you. It was written by a practicing dowser who vouches for his work.

—B. W. ALLRED

VOLCANO PROBLEMS.—Is it possible to reclaim rock for crop production? What is the best method to speed up soil formation?

These are the most commonly heard questions among farmers in the lower Puna Soil Conservation District in Hawaii.

The island of Hawaii is the largest in the Hawaiian Archipelago. It was built by five volcanoes, of which Mauna Loa and Kilauea are active periodically.

Until February 28, 1955 there had not been an eruption in the Puna section of the island for 155 years. Then within hours the people of the Puna district suffered great hardships. While forests comprised the largest acreage of land covered with molten lava, the sugarcane areas represented the greater value.

Sulfur fire, pumice deposition, and lava flow did the major damage. Sulfur caused leaf injury to nearly all of the plants. Cane, even where it was scorched by sulfur, made a comeback within 10 days. Pumice material, as it fell from the air on the foliage, had a shredding action similar to that of a severe hail storm. Where the fall was heavy, much bark was "sand blasted" from smaller trees.

The eruption destroyed 14 homes and put 3,000 acres of land out of production. Eight hundred were acres of cultivated crops. The remainder was in forest and pasture.

A major problem now is whether something can be done to aid in the return of the lava lands to economic use. Possibly, man may be able to expedite nature's weathering process on this lava. A first step may be the use of heavy rollers pulled by a large track-type tractor. This would provide more fine material for root development, and make the surface more readily accessible. By rolling, planting, and fertilizing, we might be able to make the use of the land in pasture, orchard, or woodland economically possible. Shortleaf ironwood (Casuarina equisetifolia) was to be one of the first trees to be planted on the lava after it has cooled. This may take up to 18 months, depending upon the lava's thickness.

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—ROBERT C. MALMGREN